UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, DC 20460

April 24, 2000

MEMORANDUM

SUBJECT: External Review Draft of *Guidance for Developing a Quality Assurance Training Program (QA/G-10)*

FROM: Nancy W. Wentworth */s/ Nancy W. Wentworth*
Director, Quality Staff (2811R)

TO: EPA QA Managers
External Reviewers

Attached for your review is the External Review Draft, *Guidance for Developing a Quality Assurance Training Program,* dated April 2000.

This guidance incorporates peer review comments from the July 1999 draft. This revised document presents two options for conducting a need's analysis to assist the user in identifying the required QA-related skills, knowledge, and abilities of the organization. It also provides a discussion of existing training resources, and additional guidance on using contractor resources to develop training.

Comments, suggestions, and editorial changes are solicited for all sections. Additionally, I ask that you carefully review the document with consideration to the following questions:

1.   Does G-10 provide an appropriate level of detail to guide the user in performing a QA training needs assessment?

2.   Does the document present the process in a clear and logical manner?

3.   Is the text readable and clear in its meaning? If the text is unclear, please provide alternative language to clarify the current text.

Please submit your comments by June 19, 2000, to:

G-10 Comments
Quality Staff
U.S. Environmental Protection Agency
1200 Pennsylvania Ave, NW
Washington, DC 20460

In addition, comments may be faxed to (202) 565-2441, ATTN: G-10 Comments or e-mailed to quality@epa.gov.

Your input is very important and I appreciate your time spent in reviewing this document. I strongly believe that this guidance document will facilitate the implementation of effective Quality Systems training programs in EPA organizations.

Attachment

GUIDANCE FOR DEVELOPING A QUALITY ASSURANCE TRAINING PROGRAM

EPA QA/G-10

United States Environmental Protection Agency
Quality Staff

Washington, DC 20460

APRIL 2000

EXTERNAL REVIEW DRAFT

FOREWORD

The U.S. Environmental Protection Agency (EPA) policy requires EPA organizations to develop Systems Series documents which describe the EPA training program for quality assurance and quality control. The training requirement supports EPA Quality System policies and requirements, quality assurance tools, and technical skills. This guidance was developed to help organizations in developing a QA training program to meet their specific needs.

This document is one of the *U.S. Environmental Protection Agency Quality System Series* requirements and guidance documents. These documents describe the EPA policies and procedures for planning, implementing, and assessing the effectiveness of a Quality System. Questions regarding this document or other *Quality System Series* documents should be directed to the Quality Staff:

> U.S. EPA
> Quality Staff (2811R)
> 1200 Pennsylvania Avenue, NW
> Washington, DC 20460
> Phone: (202) 564-6830
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Copies of the EPA *Quality System Series* documents may be obtained from the Quality Staff or by downloading them from the Quality Staff Home Page:

es.epa.gov/ncerqa/qa/index.html

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CHAPTER 1

INTRODUCTION

1.1   BACKGROUND

Since environmental data operations are complex, a systematic structure for quality must be established to provide confidence in the quality of information used to support decisions. Such a structure is provided by a quality system and is defined by the organization conducting environmental data operations. EPA Order 5360.1 CHG 1 *Policy and Program Requirements for the Mandatory Agency-Wide Quality System* (1998) specifies that the collection of environmental data by, funded by, or provided to the Environmental Protection Agency (EPA) be supported by an effective quality system. Moreover, all EPA organizations subject to the Order are required to provide appropriate training for all levels of management and staff. The goal of this requirement is to assure that quality assurance (QA) and quality control (QC) responsibilities are understood at every stage of project implementation. These requirements are externalized through 48 CFR 46 for contractors; 40 CFR 30, 31, and 35 for assistance agreement recipients; and other mechanisms, such as consent agreements in enforcement actions.

An effective QA training program is necessary to ensure that personnel who plan and implement environmental programs have the skills needed to perform their responsibilities.   This document provides a systematic method for developing a training program to help organizations incorporate the necessary QA and QC skills into the training curriculum.

1.2   TRAINING AND THE EPA QUALITY SYSTEM

EPA's Quality System (Figure 1) consists of three structural levels: Policy, Organization, and Project. Effective implementation of the Quality System requires that training occur at each level of the organization that performs activities affecting environmental data quality. Training needs at the various levels of the organization are task specific. Senior and line managers require training to understand the structure, concepts, and operating principles of the quality system. Technical personnel need to understand the Quality System and the QA and QC tools and techniques necessary to fulfill the requirements of the system.

The mandatory Agency-wide Quality System is based on the national consensus standard, *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs,* ANSI/ASQC E4 1994. This standard provides the management and technical elements necessary for developing and implementing a quality system. This standard also contains specifications for identifying training needs to provide the necessary level of skills in QA and QC practices for effective implementation of environmental programs.

QA training is used by an organization to ensure that all personnel involved in the planning, management, and implementation of data collection activities have the knowledge and skills to complete their tasks according to the policies and procedures in their organization's quality

system. An organization typically specifies its process for determining training requirements in its Quality Management Plan (EPA, 2000a).

1.3   SUPERSESSION

This document represents a component of the EPA Quality System for which guidance has not been previously developed. Therefore, this document does not supersede any other documents.

1.4   PERIOD OF APPLICABILITY

Per EPA Order 5360, this document will be valid for five years from the official date of publication. After five years this document will either be reissued without change, revised, or withdrawn from the EPA Quality System.

1.5   ADDITIONAL RESOURCES

Several other documents have been developed to provide suggestions on developing suitable and effective quality systems for environmental programs. These documents establish criteria and mandatory specifications for QA and QC activities and provide recommendations for using the various components of the Quality System. A list of these documents is contained in Box 1. Since these documents contain guidance on activities critical to successful environmental data operations, these should be considered as resources when developing a training program. In addition, program-specific documents should be used as a resource.

Box 1. Quality System Series Documents

<u>**Requirements**</u>
   EPA Requirements for Quality Management Plans *(QA/R-2)* (EPA 2000)
   EPA Requirements for Quality Assurance Project Plans for Environmental Data
      Operations *(QA/R-5)* (EPA 2000)

<u>**Guidance**</u>
   Guidance for the Data Quality Objectives Process *(QA/G-4)* (EPA 1994)
   EPA Guidance for Quality Assurance Project Plans *(QA/G-5)* (EPA 1998)
   Guidance for the Preparation of Standard Operating Procedures for Quality-Related
      Operations *(QA/G-6)* (EPA 1995)
   Guidance for Data Quality Assessment: Practical Methods for Data Analysis
      (QA/G-9) (EPA 1996)
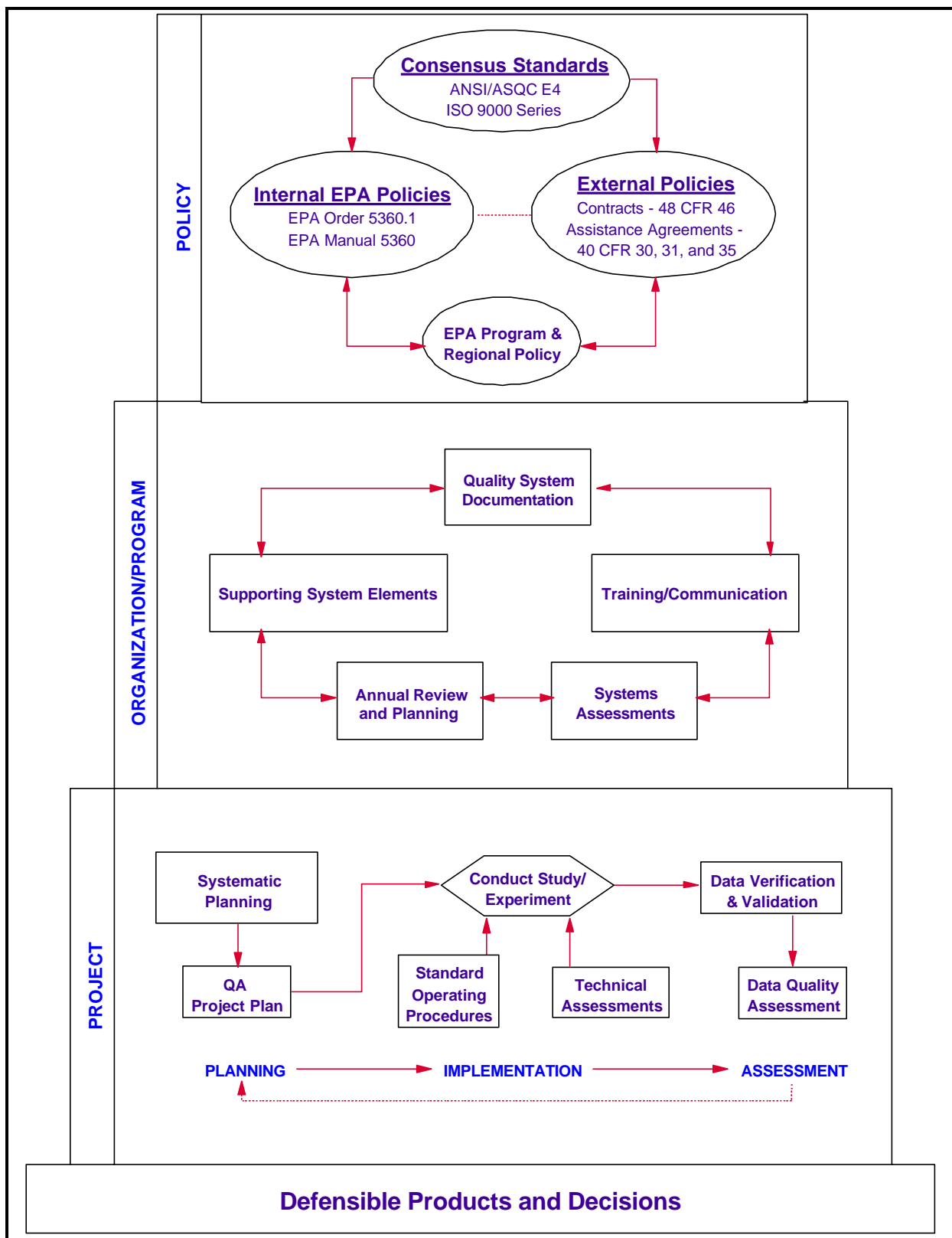
Figure 1. EPA Quality System Components

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CHAPTER 2

OVERVIEW OF QA TRAINING

2.1   POLICY

EPA policy (EPA Order 5360.1 CHG 1) requires all EPA organizations supporting environmental programs to identify program-specific QA and QC training needs for all levels of management and staff, and provide for this training. The Quality Staff of the Office of Environmental Information has the responsibility for oversight of the Agency's mandatory Quality System. The Order requires the Senior Management Official for Quality to develop generic QA training programs for all levels of EPA management and staff in addition to those currently available.

2.2   PURPOSE

An effective QA training program is one that identifies and provides the necessary knowledge and skills to allow personnel to plan and carry out environmental programs. This document provides users a guide for developing a training program that will enhance personnel performance by providing a systematic view of training development. The process outlined in this document has many steps and represents a method for building a QA-related training plan using a focused needs assessment. It is not intended for use outside of this purpose.

2.3   INTENDED AUDIENCE

The intended audience for this document includes managers, QA personnel, and other potential QA training providers that participate in environmental programs governed by the EPA Quality System. Users of this document will have primary or contributory roles and responsibilities for assessing the need for QA training and for developing a QA training program for a specific Region, National Center, Laboratory, or Program Office. Although this document focuses on EPA organizations, it can be tailored to the needs of a variety of other Federal agencies, State, local or Tribal agencies, and non-governmental organizations as well as contractors and financial assistance recipients.

2.4   GENERAL CONTENT AND DETAIL REQUIREMENTS

This document describes a process for developing a training program that will meet the requirements of EPA Order 5360.1 CHG 1. The steps described in this document are designed for a general audience with limited experience in training plan development but can be used by anyone involved in QA and QC related issues.   It is preferable to have someone with training expertise involved in the development effort. Each organization should evaluate the steps described in the document and determine how they relate to the organization's needs. Each step should be reviewed for applicability and adhered to, as appropriate, to ensure thorough training plan development takes place.

2.5   RESPONSIBILITY FOR TRAINING

EPA Order 5360.1 states the ultimate responsibility for ensuring that training needs are identified and appropriately addressed rests with the program, region, laboratory, management, or other organizational units.

Per EPA Order 5360.1 CHG 1, EPA's Senior Management Official for Quality is responsible for developing generic training programs, based on perceived needs, for EPA management and staff, to ensure quality management responsibilities and requirements are understood at every level of the organization. The national QA training program was developed in response to this clause of Order 5360.1 (see Chapter 5). The task of implementing the training program has been delegated to the Quality Staff.

2.6   BENEFITS OF QA TRAINING

QA training can:

1.   help institutionalize EPA's Quality System through learning,
2.   provide guidance on how to comply with EPA QA policies and requirements,
3.   enhance individual performance by developing proficiencies in the use of QA and QC tools and related technical skills, and
4.   standardize QA Policy throughout the Agency.

The depth of each employee's knowledge and skills contributes to the Agency's ability to achieve its mission and goals. Thus, all EPA personnel should be trained to a level that advances the Agency's commitment to protect human health and safeguard the natural environment by providing environmental data that are credible, scientifically sound, and of adequate quality.

CHAPTER 3

A DETAILED APPROACH TO BUILDING A QA TRAINING PLAN

3.1   OVERVIEW

A QA training program should facilitate the achievement of an organization's mission, goals, and objectives. The QA training program is documented in a training plan. To be properly aligned with the organization, the training plan should be developed with accurate information, stakeholder participation, and attention to the unique needs and constraints of the organization. The process of creating a training plan includes six phases that are explained in this chapter: (1) Up-front Analysis (Section 3.2); (2) Needs Assessment (Section 3.3); (3) Data Analysis (Section 3.4); (4) Development (Section 3.5); (5) Construction (Section 3.6); and (6) Evaluation (Section 3.7). Blank copies of the forms used in these sections are contained in Appendix A. The focus of this chapter is on preparing a training plan, however limited attention is given to exploring other solutions to fulfill an organization's need.

A QA training plan may include a variety of methods for providing knowledge, skills, and abilities (KSAs) to employees. While core training requirements may be appropriate for all members of the organization, ultimately the QA training program should ensure that all personnel have the necessary level of experience or training to enable them to competently perform designated tasks. Therefore, it is important that each level of the EPA organization be analyzed in terms of its needs and KSAs.

The process of determining QA training needs should be documented in each organization's Quality Management Plan. Training needs will be specific to the tasks and functions at each level of the Quality System. An understanding of the typical tasks and functions that occur at each level will help in assessing organization specific, QA related training needs. A list of typical functions and processes that occur at each level follows:

Policy
- agency mission, organizational functions, policies, procedures,
- implementing Agency and government-wide regulations,
- decision and policy making processes for environmental protection, and
- budget formulation and executive processes.

Organization/Managerial
- defining roles and responsibilities of staff and
- carrying out the organization's mission through programs

Project Level
- defining project scope/requirements management,
- managing project time/cost/performance management,
- ensuring project quality management, and

- project procurement management.

The process outlined in the following pages is iterative in nature and should involve periodic communication with and participation from stakeholders in the organization that is developing the training plan. Each phase's complexity will vary with the type and size of the organization or unit being addressed. The end result should be a QA training plan that yields acceptable results and a strengthened quality system carried out by knowledgeable and skilled staff.

3.2   PHASE 1: UP-FRONT REVIEW

UP-FRONT ANALYSIS

Reasons for building
a QA training plan

Determine the best
solution

Create a team and
assign roles

ASSESSMENT

ANALYSIS

DEVELOPMENT

CONSTRUCTION

EVALUATING THE PLAN
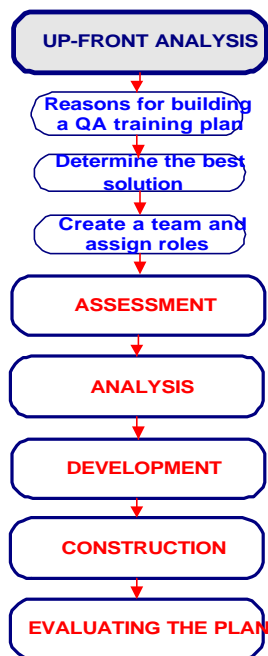
The purpose of the *Up-Front Review* is to:

1.   describe the reasons for building a training plan,
2.   determine the best solution, and
3.   create a team and assign roles.

Reasons for Building a QA Training Plan

Training plans are developed for a variety of reasons, for example, to meet directives from senior management or address a performance issue. Understanding the need for the training plan provides insight into the expectations the plan needs to meet — both the obvious and the obscure. If a directive from senior management provides the impetus for creating the plan, one should become familiar with the reason for the directive. Is the organization ensuring that mission critical skills are available, supporting a specific project, or does a performance issue exist?

Performance issues include communication, management, attitude, changes in responsibilities, changes in technology, and lack of necessary skills. Sometimes the most appropriate method for addressing identified problems is training, but training alone rarely solves all performance problems.

Determine the Best Solution

In order to determine if training or some other method is the most appropriate method for addressing a problem, the problem needs to be researched. Start with the initial source of the information. Try to find out:

•   how the problem was identified;
•   the criteria the solution is expected to meet (cost versus benefit, timeliness, and management's expectations);
•   the scope of the problem (individual, team, or organization); and
•   from whose perspective the problem exists (individual or management).

Training is the best solution when the problem exists, at least in part, because the worker does not know how to meet expectations for performance requirements. When a lack of knowledge, skill, or ability is not the cause of the performance problem, then a non-training solution should be developed. If a non-training solution is required, the Human Resources Department may be able to provide assistance, and in some cases, contractor assistance may be needed (see Chapter 5 for more information). Occasionally, a lack of training is perceived as the cause of a performance issue to avoid addressing changes in a unit or organization. Caution should be taken in determining the best solution.

Create a Team and Assigning Roles

The work involved in building a QA training plan, including the up-front review, can be time consuming. It should not be assumed that this process is the primary role of the QA Manager or the QA support staff. The development and implementation of the training plan will be made much easier by pulling together a team of key individuals in the organization. This early, yet critical step helps gain support for the project throughout the organization. Also consider keeping stakeholders and decision makers within the organization up-to-date on the progress of the assessment and involve them where appropriate. Explain to stakeholders how the needs assessment process assists the organization in complying with the order and share the progress with them.

The training plan can be developed and implemented by Human Resources Staff or through contractual mechanisms. Wherever possible, the QA Manager or designee should provide their opinion and validate the results. Early on, identify and clearly communicate the roles and responsibilities of those who will be working on the process and revisit them throughout the development process.

When working with the team, familiarity with problem solving tools and techniques may be helpful. Addressing possible solutions for performance problems or training issues, brainstorming solutions, and seeking aid from others who have faced similar situations may prove helpful. During a brainstorming session, present information about the performance problem, identify all the criteria the solution is expected to meet (including existing policies and procedures), and list all potential solutions. After creating a list, select those options that meet the criteria and determine which are most appropriate. Determine if the selected solutions will work optimally on their own or in combination with each other.

The outputs for this phase are listed below. They should be documented in a report and approved according to the appropriate chain of command.

Box 2. Phase 1 Outputs

To perform an up-front review, complete the following tasks:

_____ Identify the problem the training plan is supposed to solve
_____ Form a project team as appropriate
_____ Create a stakeholder group
_____ Identify the optimal solutions to the problem

3.3   PHASE 2: NEEDS ASSESSMENT

UP-FRONT REVIEW

NEEDS ASSESSMENT

Decide which jobs to assess

Identify required KSAs

Identify QA related KSAs

Determine existing knowledge and experience

ANALYSIS

DEVELOPMENT

CONSTRUCTION

EVALUATING THE PLAN

A *Needs Assessment* is the process used to identify and understand the particular QA-related training goals of a specific job, team, organization, or agency. The process involves identifying the gaps in KSAs which are the primary components that enable an employee to perform their job.

Existing knowledge, skills and abilities (KSAs)	⬌	Necessary knowledge, skills and abilities (KSAs)

Figure 2. Needs Assessment Model

A training plan outlines the training needs and how they will be met in great detail. A QA training plan outlines the particular needs of a unit or organization for which quality assurance is a primary focus.

Identifying the training goals helps to ensure that the QA training plan makes the best use of available resources. It may also be helpful to review existing data. Additional information to support the Needs Assessment may be found in Management Systems Review reports, internal assessment studies, or Inspector General reports.

There are three basic steps to performing a needs assessment:

1.   decide which jobs to assess,
2.   identify the QA related KSAs required to perform the jobs, and
3.   determine the existing knowledge and experience.

Decide Which Jobs to Assess

Deciding which jobs to assess will determine the scope of the needs assessment and ensure its validity. The decision begins with the identification of an appropriate unit for assessment. The results of the up-front review may logically suggest a certain unit of jobs within an organization. The unit should contain related jobs that facilitate an organization's QA work. It can be a cross section of the organization or a unit within it and should cover all positions involved with environmental data operations, including data users, data generators, and decision makers. Because the Quality System operates at the project, organizational, and policy levels, it is crucial that the training plan address the QA training needs of each level.

Once the unit of jobs has been defined, identify its associated responsibilities and activities. Most likely, this information already exists and can be found through the Human

Resources Staff, organization charts, public documents, and employment solicitations. The information should be documented in the Unit Assessment Form (see Appendix A).

The focus of this phase is on the actual job roles or functions in the unit rather than on the individual employees. The information will be used later to identify which KSAs the personnel need to perform their jobs effectively. In this step of the process, it will describe the unit under assessment. The Unit Assessment Form should result in a list of responsibilities and activities that can be examined in terms of what is needed to perform them. See Figure 3 for an example of a completed form.

Date: January 24	**Name:** Jane Doe	
Unit Description: Program Oversight Section		
Job List (include all functions in the unit listed above) Work Assignment Manager (WAM) Hydrologist Database Managers Technical Liaison		**Staff Size:** 8-10 full time employees
Job Title	**Responsibilities**	**Primary Tasks**
Environmental Scientist	WAM	Assure effective performance
		Evaluate performance
	Technical Liaison	Manage communications networks for local governments

Figure 3. Example Unit Assessment Form

Identify the Required QA Related KSAs

The list generated by the Unit Assessment Form provides the framework for performing the job assessment. Job assessment is the process of breaking a job down into specific tasks and evaluating the knowledge and skills needed to perform them.

There are several methods for performing a job assessment, but the easiest and most applicable method creates a hierarchy of tasks and sub-tasks necessary to perform a job. The Hierarchical Job Form can be used as a guide throughout the process. The form results in a list of QA-related KSAs required to perform each job within a unit. A model for identifying QA-related KSAs is contained in Box 3.

Box 3. Hierarchical Job Assessment

1. Identify the primary tasks of a job

2. Identify the general KSAs

3. Identify the QA related KSAs

Task 1	Task 2	Task 3
Step 1	Step 1	Step 1
General KSAs	General KSAs	General KSAs
QA Related KSAs	QA Related KSAs	QA Related KSAs
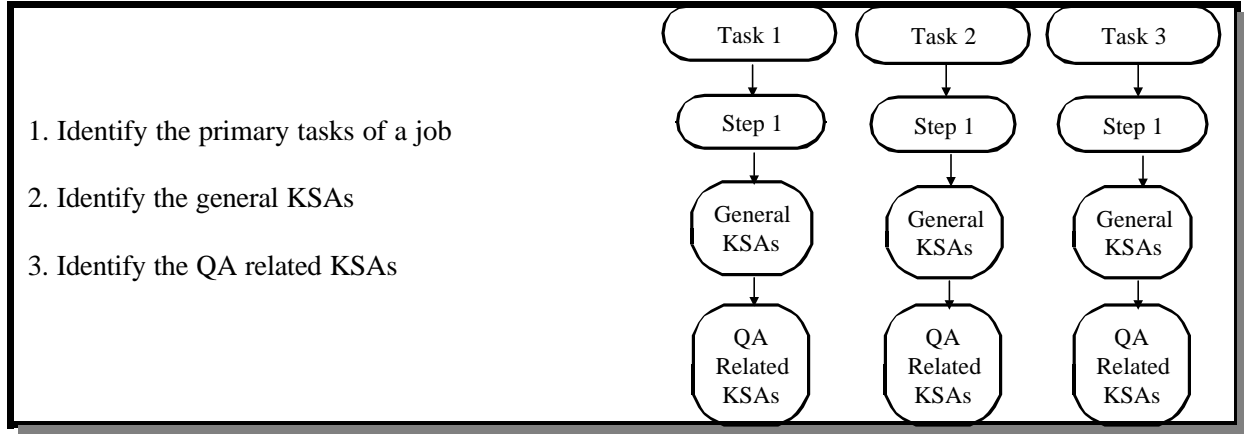
A job assessment requires the identification of several levels of detail. It is appropriate to break down the skills needed to perform a job task until the level of prerequisite knowledge is reached. Figure 4 contains the Hierarchical Job Assessment Form, that provides an example of a job assessment conducted on a portion of a Work Assignment Manager's responsibilities. Appendix A contains a copy of this form.

The information from the job assessment should be validated with staff members who perform the tasks and their feedback should be implemented where appropriate. It may also be helpful to get feedback from an outside organization who has experience in the work area. The product of this form should be a list of QA-related KSAs required to perform a specific job

Determine Existing KSAs

The final step in Phase 2 is to identify the existing KSAs of employees who are currently performing or will potentially perform QA related functions. This step should validate the information collected so far and identify a baseline for the training goals. There are three steps involved in determining existing KSAs:

1. conduct research,
2. confirm findings, and
3. document findings

To start this process, decide whether the unit will be assessed in its entirety, or whether it will be broken into smaller groups (e.g., by job category or organizational level). It is inadvisable to break the unit down by individual employee since it is likely the QA training plan will apply beyond a given employee's tenure in that particular position.

A.	**Job Title**

B.	**Primary Job Tasks**
	1. Assure effective performance
	2. Evaluate performance

C.	**List the Sub-tasks related to each task**	
	Task 1 Assure effective performance	**Task 2** Evaluate performance
	Sub-task 1 Inspect work	**Sub-task 1** On site inspection
	Sub-task 2 Review progress reports	**Sub-task 2** Evaluation of outputs
	Sub-task 3 Review outputs	

D.	**List KSAs needed to perform each sub-task**	
	Task 1 Assure effective performance	**Task 2** Evaluate performance
	Sub-task 1 Inspect work **KSA:** Ability to evaluate and analyze technical and/or administrative issues involved in implementation of environmental programs	**Sub-task 1** On site inspection **KSA:** Ability to evaluate environmental; monitoring aspects of the work assignment
	Sub-task 2 Review program reports **KSA:** Ability to communicate environmental information orally and in writing	**Sub-task 2** Evaluation of outputs **KSA:** Ability to review, analyze, and recommend modifications to outputs including QA Project Plans or data reports
	Sub-task 3 Review outputs KSA: Knowledge of work plan and QA Project Plan development and review	

E.	**List QA Related KSAs**
	Task 1 • Ability to apply QA and QC criteria to technical directives as appropriate • Knowledge of basic QA concepts and terms • Knowledge of QA Project Plan review skills
	Task 2 • Ability to performance technical systems audits • Ability to perform environmental data evaluation

Figure 4. Hierarchical Job Assessment Form

Reading performance reviews and training records as well as conducting interviews with members of the unit are useful in identifying existing knowledge and experience within a job category or organizational level. Interviews can be conducted with the entire unit or a representative sample, depending on its size and the availability of resources needed to conduct the interviews.

Sample interview questions of the employee may include the following:

- Does the employee perform the task?
- How frequently does the employee perform the task?
- How would the employee rate their ability to perform the task?
- What are the employee's reasons for their rating?

Other sources of information may include observing employees on the job, talking with those who are outside the job's scope but work with those who are within it, and reviewing customer feedback records.

After current skills data has been collected, members of the unit or stakeholders should review the results and provide feedback. They should make sure that all existing KSAs are noted and that none are there that do not belong. Ensure that information collected is that which was intended. Developing training goals based on inaccurate or non-representative information can be counterproductive to the organization.

Box 4. Phase 2 Outputs

Complete these tasks to perform the needs assessment.

_____ Unit Assessment
_____ Hierarchical Job Assessment
_____ Assessment of Existing KSAs

3.4   PHASE 3: ANALYZING THE NEEDS ASSESSMENT DATA

UP-FRONT REVIEW

NEEDS ASSESSMENT

ANALYSIS

Compare existing and required skills

Validate the results

DEVELOPMENT

CONSTRUCTION

EVALUATING THE PLAN
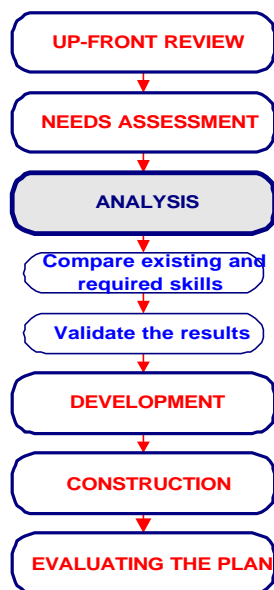
Needs Assessment data analysis is the process of identifying the differences or gaps between what is needed to perform a job and what performance criteria are currently being met. This process includes the following steps:

1.   compare existing skills with required skills and
2.   validate the results

Compare Existing and Required Skills

The Gap Analysis Matrix (Table 1) was designed to assist in making this comparison. Enter a job category or unit description on the top row of the matrix as indicated below. Enter the KSAs required to perform each job on the first column. Indicate when a job category has sufficient quantity and quality of given KSAs to achieve satisfactory job performance by placing a mark in the corresponding box. This determination call should be made by someone who is familiar enough with the job category to understand the requirements to fulfill it effectively.

Depending on the size of the unit, the QA-related KSAs may differ widely between job categories. If this is the case, a separate analysis should be made of each. If no job category breakdown is necessary, the entire unit should be analyzed together. This can be accomplished by using a simple matrix.

Table 1. Gap Analysis Matrix

Required KSAs	Program Oversight Section
Ability to apply QA concepts to environmental study plans and reports	
Ability to apply QA and QC criteria to technical directives as appropriate	
Knowledge of basic QA concepts and terms	U
Knowledge of QA Project Plan review skills	U
Ability to perform technical systems audits	
Ability to perform environmental data evaluation	

If accurate and representative data are collected from an organization, the results will provide adequate information about the QA-related training needs. This information should be

described in a detailed report that explains how the process was performed, lists the results, and provides the analyst's interpretation of them.

If the results indicate that there are no QA-related training needs, then the process ends with the analysis. If the results show a need for QA-related training needs, the information will be used during subsequent phases of this process.

Any KSAs that currently do not exist in sufficient quantity and quality, either by job category or unit should be documented. This list of KSAs is the gap that needs to be bridged in the development of the QA training plan and should be translated into training goals. A training goal should be stated in as much detail as the KSA gap indicates along with any other criteria the training plan should meet. It should describe what would change, how work might flow, how quickly it might be completed and to what result.
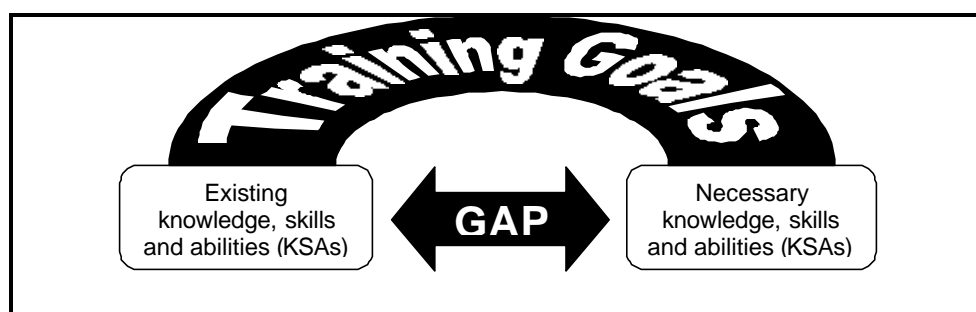
Figure 5. Gap Analysis Model

Validate the Results

Feedback on the results of the needs assessment should be obtained from the stakeholders, regardless of what the results indicate. If the stakeholders cannot validate the results, their concerns should be taken seriously and discrepancies should be resolved prior to continuing the process. The person who originally requested that this project be completed may be a source for resolving any discrepancies.

Box 5. Phase 3 Outputs

Complete these tasks to perform a Gap Analysis:

_____ Record Gap Analysis results for each job category or group of jobs
_____ Document findings

3.5   PHASE 4: DEVELOPING A QA TRAINING PLAN

The purpose of the *Development Stage* is to create an approach for meeting the QA training goals. There are four steps:

1.   rank the training goals,
2.   compare the current QA training resources to training goals,
3.   define success, and
4.   validate and document results.

Rank the Training Goals

The first step in this phase is to rank an organization's training goals so a plan can be formulated to meet them. Identify the level of each training goal (either policy, organizational, or project). Working with representatives from each level, discuss the training goals and their priority in the organization until the group reaches a consensus on the list. Each goal should be analyzed separately. This discussion should not revisit whether or not it is valid, but should determine how important it is to the organization.

The *Ranking Matrix*, (see Table 2 below) lists the training goals on the left side and identifies the criteria for determining their priority across the top. This criteria can be selected by the group working on prioritizing the needs. Each need should be given a weight. Then, each training goal should be evaluated to see if it meets each criterion and given a priority number. The priority number should be multiplied by the weight of the criterion and added to the score from all the criteria for that option. The Ranking Matrix should yield a list of prioritized training goals.

Define Success

Defining success will:

•   provide a unified understanding of the desired state of each training goal,
•   help to avoid confusion as the plan is being developed, and
•   describe the end state, so it is clear when success has been achieved.

Successful achievement of each training goal was described in Phase 3. A successful training plan might include more than the successful achievement of the training goal. Any additions to the description of success should be made at this time and agreed upon by the stakeholders.

Table 2. Ranking Matrix

Options - Unmet Training Needs	CRITERIA				
	Job Related Weight 15%	**Mission Essential** Weight 30%	**Agency Requirement** Weight 30%	**Career Development** Weight 25%	**Total Weight** 100%
Ability to apply QA concepts to environmental study plans and reports	1 (.15)	3 (.90)	2 (.60)	1 (.25)	**1.9**
Ability to apply QA and QC criteria to technical directives as appropriate	1 (.15)	3 (.90)	2 (.60)	1 (.25)	**1.9**
Ability to perform technical systems audits	5 (.75)	1 (.30)	3 (.90)	3 (.75)	**2.7**
Ability to perform environmental data evaluation	1 (.15)	1 (.30)	1 (.30)	2 (.25)	1.0

Compare Resources to Goals

The next step is to research the QA-related training that is currently being offered and the course objectives this training meets. A Course Evaluation Matrix (Table 3) documents how well an existing course meets the training goal. The current QA-related training courses should be listed on the left side of the matrix. Chapter 4 discusses resources for generating such a list. The training goals should be listed across the top of the matrix. Each course should be evaluated in terms of how it meets each training goal. A checkmark should be placed in the box where a course meets a training goal.

The *Course Evaluation Matrix* should yield two lists. One list should consist of training goals that can be adequately met by current course offerings. The other list should contain training goals that cannot adequately be met by current courses. An approach for meeting the latter group of training goals will need to be designed and information about this can be found in Chapter 5 of this document. Both lists should include the rank or weight of all the training goals that was determined in the Ranking Matrix in Table 2.

Table 3. Course Evaluation Matrix

Course	Apply QA concepts to environmental study plans and reports	Apply QA and QC criteria to technical directives as appropriate	Perform technical systems audits
Introduction to EPA Quality System Requirements *VENDOR*: **Unknown**		U	
Management Systems Review Workshop *VENDOR*: **Unknown**			
Introduction to DQOs *VENDOR*: **Unknown**	U		
Integrating QA into Project Development (Advanced) *VENDOR*: **Unknown**	U	U	
Sampling Designs for QA Project Plans (Advanced) *VENDOR*: **Unknown**	U		
Data Quality Assessment *VENDOR*: **Unknown**	U		

Validate and Document the Results

All new data should be validated by people familiar with the courses and the ranked training goals. Their feedback should be represented in the results of this comparison. The final result of this phase should be documented in a report and shared with the appropriate staff.

The completion of the Course Evaluation Matrix concludes the data collection and evaluation portion of building the training plan. The next portion focuses on constructing and evaluating the QA training plan prior to its implementation.

Box 6. Phase 4 Outputs

Complete these tasks to develop the QA training plan:

_____ Rank the training goals
_____ Identify gaps in resources

3.6   PHASE 5: CONSTRUCTING THE QA TRAINING PLAN

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┌─────────────────────────────┐
│     UP-FRONT ANALYSIS       │
└─────────────────────────────┘
              ▼
┌─────────────────────────────┐
│        ASSESSMENT           │
└─────────────────────────────┘
              ▼
┌─────────────────────────────┐
│         ANALYSIS            │
└─────────────────────────────┘
              ▼
┌─────────────────────────────┐
│        DEVELOPMENT          │
└─────────────────────────────┘
              ▼
┌─────────────────────────────┐
│       CONSTRUCTION          │
└─────────────────────────────┘
              ▼
┌─────────────────────────────┐
│      Create a time line     │
└─────────────────────────────┘
              ▼
┌─────────────────────────────┐
│   Identify How the Goals    │
│        Will be Met          │
└─────────────────────────────┘
              ▼
┌─────────────────────────────┐
│     Identify redundancy     │
└─────────────────────────────┘
              ▼
┌─────────────────────────────┐
│ Identify roles & responsibilities │
└─────────────────────────────┘
              ▼
┌─────────────────────────────┐
│     EVALUATING THE PLAN     │
└─────────────────────────────┘
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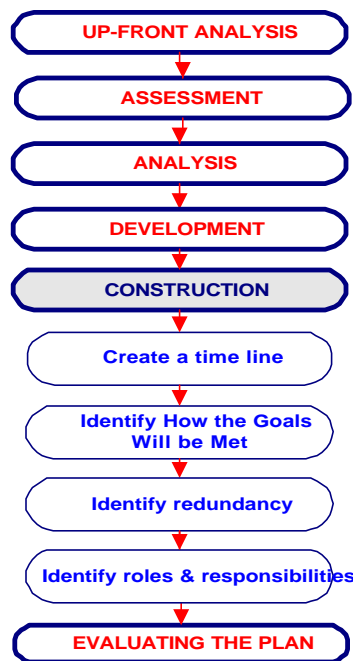
Phase 5 of building a QA training plan is the last portion of the process prior to implementing the plan. The *Construction* phase puts together the conclusions reached during the data collection and evaluation phases to attain the training goals. The process of constructing the training plan includes:

1.   creating a time line for achieving each training goal,
2.   identifying how each training goal will be met,
3.   identifying redundancy, and
4.   identifying roles and responsibilities.

Create a Time Line

The purpose of a time line is to determine which goals will be met at what point during the plan's life cycle. This determination will be made according to two pieces of data — the priority of the training goal and the availability of resources needed to achieve the goal. Availability of resources refers to both the amount of resources that exist and the likelihood of obtaining the necessary resources. If resources are not available to fulfill a high priority training goal it might be necessary to either identify alternative resources for meeting the training need or revisit its' priority for the organization. Resolving any conflicts between priority level and availability of resources requires flexibility and management support.

The basic information needed to make these decisions comes from the results of the *Course Evaluation Matrix* and the *Prioritization Matrix* from Phase 3.

Identify How the Goals Will be Met

Identifying a method for meeting training goals can either be done before, in conjunction with, or after the creation of the time line. There are several considerations when deciding how to achieve an organization's training goals:

1.   financial resources,
2.   available time,
3.   available personnel and their skills,
4.   existing programs that can be adapted for use,
5.   costs of these resources, including administrative costs,
6.   types of training that are needed, and
7.   personality, attitude, learning capabilities, and size of the audience.

These items will help determine if the match between the training goal and the existing courses is strong, as well as begin the process of addressing the needs not met by current offerings. Some familiarity with the six basic methods for training personnel may also be helpful. Table 4 lists a variety of training platforms including formal training like classroom, computer based, video based, and print-based instruction. It also includes the informal on-the-job platform. These platforms can be mixed and matched to suit a particular need.

Table 4. Training Media

Medium	Advantages	Disadvantages
Classroom	• Inexpensive to develop • Easy to produce/reproduce • Allows student participation	• Travel costs • Limited availability of qualified instructors
Computer-Based Multimedia	• Interactive • Individualized • Realistic simulation capabilities • Consistent instruction	• High up-front development costs • Hardware access • Expensive to revise
Distance Learning	• Reaches geographically-dispersed audience	• High delivery costs
Video-Based	• Excellent for presenting overviews of programs • Easy to distribute • Attention getting	• Not easy to revise • High up-front costs
Print-Based	• Inexpensive to develop • Easy to produce/reproduce • Unlimited capacity for information	• Not as aesthetically pleasing as multimedia
On-the-job	• Low cost • Easy to implement • Flexible • Provides practicing opportunities	• May slow down pace of work and interfere with time limits for job performance

Table 5 provides a template for documenting how the training goals will be met. For each Training Goal, list its priority, when it should be met, the method or methods that should be used, the resources needed, and the availability of resources.

Table 5. The QA Training Plan

Training Goal	Priority	Due Date	Training Method(s)	Resources Needed	Resource Availability
Apply QA concepts to environmental study plans and reports	2	09/30	Classroom OJT	• Existing programs • New programs • Training dollars • Personnel availability • Personnel support	• Existing programs • Personnel availability
Apply QA and QC criteria to technical directives as appropriate	2	09/30	Classroom OJT	• Existing programs • New programs • Training dollars • Personnel availability • Personnel support	• Existing programs • Training dollars • Personnel support
Perform technical systems audits	1	06/01	CBT	• New programs • Training dollars • Personnel availability • Personnel Support	• Personnel support

Identify Redundancy

After reviewing the QA training plan, there may be some organization-wide training goals that, because of their topics or methods of achieving the goal, can be linked together in the training plan. For example, a Needs Assessment may establish that all Project Officers have QA-related tasks. An organization may have a training need or requirement for all of its employees to participate in Basic Project Officers Training. It may be possible that QA training can fulfill some or all of the QA-related requirements for Basic Project Officers Training. Regardless of the extent to which the requirements can be met, making use of appropriate existing courses, rather than creating new ones, creates a cost effective solution. In such a situation, the training goals would be stated separately, but they can share a solution.

Identify Roles and Responsibilities

After the QA training plan is developed, delegating pieces of it to different organizations, units, or individuals may be appropriate. There should still be one individual who coordinates the implementation plan. That individual may be the same person who coordinated the development of the plan, or it may be a completely different individual. If the training plan is being handed off to someone else to coordinate, the new coordinator should be familiar with how the training plan was developed, its objectives, and the desired outcomes of the process.

Maintaining open lines of communication during the plan's development with all stakeholders is still important. This group should review the progress of the training plan throughout the development process so that they remain involved in it and can support it.

Box 7. Phase 5 Outputs

Complete these tasks to construct the training plan:

_____ Create a time line
_____ Choose methods for achieving the training goals
_____ Discuss the plan with stakeholders
    _____ Assign roles and responsibilities

3.7   PHASE 6: EVALUATING THE QA TRAINING PLAN

UP-FRONT REVIEW

NEEDS ASSESSMENT

ANALYSIS

DEVELOPMENT

CONSTRUCTION

EVALUATING THE PLAN

Compare to original request

Compare to training goals

Stakeholder review
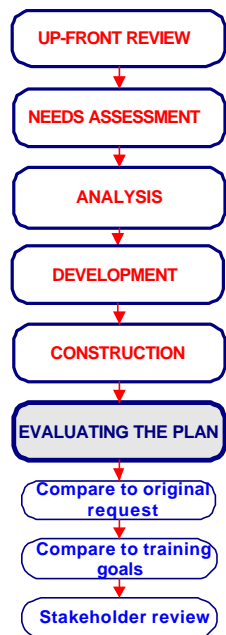
The last phase of building a QA training program is *Evaluating* the plan to make sure it is sufficient in scope and will meet the needs of its users. The following three areas are important when evaluating a training plan:

1.   original request,
2.   training goals, and
3.   stakeholder feedback.

The Original Request

Before considering the QA training plan complete, the original request or directive that started this process should be reviewed for consistency. If the plan does not meet the criteria set from the beginning, there are two options. The first option is to alter the plan to meet the criteria that are not met. This option is viable if the missing criteria are fairly simple to insert into the plan and will not make major changes in its approach. If this option is not viable, the second option is to meet with the originator of the request to obtain their input on the plan. With some creative thinking, some pieces of the plan may be salvaged or revised without having to repeat the entire process.

The Training Goals

It should be determined if the plan has the reasonable potential to meet the original training goals and if any revisions might increase the likelihood of its success. To make this evaluation, one can refer to the training goals identified in Phase 3. Review the training goals and the plan to meet the goals, which is listed in Phase 5. If the suggestions in Phase 5 do not correlate with the training goals, revisions to one or both are necessary. Most likely the revisions need to be made in the approach rather than the goals, but both items should be considered. To make these revisions, refer back to the process recommended in the pertinent phase.

Stakeholder Feedback

If the stakeholders of the training plan have been kept up-to-date on the various milestones of the project, this final review will not produce many surprises. To send the plan out for review, package it in a format that is easy to read. The stakeholders should be provided with guidance on the type of feedback being sought and a deadline for providing it. Once their feedback has been received, implement their suggestions wherever possible. Their feedback may represent the needs and concerns of the average user and will increase the support for the plan.

After the first review, the plan should be sent out for subsequent reviews before finalizing it. While the same people can review the plan more than once, new reviewers might pick up

different details than those who have seen it before. The number of reviews should be limited to only that which will enhance the quality of the plan.

Additionally, it is important to track the QA training plan's contribution to the organization's mission and goals. This task involves getting feedback from the students, managers, and customers, some of whom may be included in the stakeholder review described previously.

Box 8. Phase 6 Outputs

Complete these tasks to evaluate the training plan:

_____ Align plan with original request
_____ Ensure training goals are met
_____ Send the plan out for review

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CHAPTER 4

A SIMPLIFIED APPROACH TO BUILDING A QA TRAINING PLAN

4.1   OVERVIEW

Chapter 3 outlines one method of building a training plan that works well when resources are not a limiting factor. Frequently, limited resources require a simplified approach that still produces a high quality result. This chapter outlines such an alternative.

A successful QA training plan facilitates the achievement of an organization's mission, goals and objectives. It is important that the process include accurate information and attention to the unique needs and constraints of the organization.

This chapter describes a simplified approach (Figure 6) to developing a QA training plan that can be used when time, personnel, or other resources are limited. This approach offers flexibility, allowing the user to choose those recommendations that best meet the current needs, understanding that the closer the outline is followed the more thorough the result will be. Steps in this approach include:

1.   Get Informed (Section 4.2),
2.   Organize the Workload (Section 4.3),
3.   Perform Gap Analysis (Section 4.4),
4.   Identify Methods of Addressing the Gap (Section 4.5), and
5.   Formulate the Plan (Section 4.6).

The abbreviated process uses an outline similar to the more detailed process, but the methods of completing each phase have been simplified. To create this process, Chapter 3 was reviewed and steps were evaluated in terms of their necessity developing an effective QA training plan and the impact if they were removed. A description of the evaluation of the steps and the impact of their removal is contained in Section 4.7.

Figure 6. Developing a Training Plan

In both the detailed and simplified approaches to developing a training plan, it is likely that training needs will be specific to the tasks and functions at each level of the Quality System.

Each step in the simplified process builds upon the step that precedes it, with exception of Organize the Workload. Organize the Workload will have an alternative order for completing this phase.

4.2   PHASE 1: GET INFORMED

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┌─────────────────────────┐
│      Get Informed        │
└─────────────────────────┘
            ↓
  ( Review existing data )
            ↓
  ( Conduct Observations )
            ↓
  ( Survey Stakeholders )
            ↓
  ( Draw Conclusions )
            ↓
┌─────────────────────────┐
│    Organize Workload     │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│   Perform Gap Analysis   │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│   Identify Methods of    │
│    Addressing Goals      │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│   Formulate the Plan     │
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The purpose of the *Get Informed* phase of the process is to identify the reason for developing a training plan and to what unit within the organization it should apply. The following tasks facilitate the completion of this phase:

1.   review existing data,
2.   conduct observations,
3.   survey stakeholders, and
4.   draw conclusions

The first task is to obtain and review existing documents or information:

•   policies or directives,
•   job descriptions,
•   work plans,
•   assessment reports, and
•   Inspector General reports.

Assessment reports may not attribute findings to a need for training, but may point out where performance issues exist within an organization. The remaining documents may indicate skills needed by employees to fulfill either the new policy or a particular job. This information will help determine if training is the most appropriate solution to the performance issue.

When a lack of knowledge, skill, or ability is not the cause of the performance problem, then a non-training solution should be developed. Validate this decision by completing this phase.

The next step in this phase is to conduct on-the-job observations. To use this tool, the observer should have some familiarity with the tasks at hand or the job being observed. Performance issues can be validated or reasons for developing the training refocused by observing the employees as they go about their work. The person making the observation should pay attention to the employee's:

1.   understanding of the task/job,
2.   ability to perform it within a reasonable amount of time,
3.   method of approaching the task/job, and
4.   quality of work.

The observations should be documented and included in the full report at the end of this phase.

The final step in this phase is to survey a sample of stakeholders, defined as those who have a significant interest in the outcome of the training plan, to determine whether the way current QA training is provided meets the needs of the clients. This information builds on the understanding of the reasons for developing the training identified in the first two tasks. It can also be a means for performing a customer service check of the training currently provided to the unit. The interviewer may discover that the training topic or format can be altered to provide maximum benefit to the student. The results of this survey should also be noted so that they can be included in the phase report.

Box 9. Alternative Phase 1 Outputs

At the end of Phase 1, the following tasks should be complete:

_____ Decide whether or not training is the best course of action,
_____ Obtain customer input about currently available training, and
_____ Write a report that includes the above items and a description of the current state of employee's QA related KSAs.

4.3   PHASE 2:   ORGANIZE THE WORKLOAD

Get Informed

↓

Organize Workload

↓

Identify skills and experience

↓

Identify and assign roles

↓

Perform Gap Analysis

↓

Identify Methods of Addressing Goals

↓

Formulate the Plan

Under ideal circumstances, a team of people will be responsible for attending to all the details of developing a training plan. The development team can be as small as 2 individuals or as large as resources allow. For more information on working as part of a team, refer to Section 3.2, Phase 1. If these resources do not exist, an individual can develop a successful training plan as long as they are well organized. The following tasks are useful in identifying the best individual(s) to develop the plan and for handing off the project to them:

1.   identify skills and experience needed to develop the plan,
2.   identify the roles required to develop the plan,
3.   list the possible candidates, and
4.   select the best choice(s).

The first task is to identify what skills and/or experience will facilitate the development process. Such skills or experience might include:

- familiarity with work of the unit,
- understanding of the relationship between the work of the unit and EPA's quality assurance requirements, and
- familiarity with training principles or plans.

Once the skills and/or experience have been identified, a list of candidates who have them should be made.

The second task of this phase is to consider the roles of the team or individual creating the plan. Roles might include:

- data collector,
- data analyzer,
- creative thinker,
- resource finder, and
- support generator.

Determine if there are any candidates on the list that have the skills and/or experience as well as the ability to handle the roles needed to develop the plan. Choose the team members or individual that has the most crucial skills, experience, and abilities.

After responsibility has been assigned, the following must also be done:

a. list the tasks to be completed, using this document for guidance,
b. establish specific guidelines for completing these tasks,
c. identify time frames in which the tasks should be completed, and
d. assign them to a team member if the team approach is being used.

The report from this phase can be developed by the lead person if they have already been selected to organize their workload or it can be used to acclimate them into the project. Before beginning Phase 3, the responsible party(s) should have a clear understanding of their assignment and the roles they are expected to fill.

Box 10. Alternative Phase 2 Outputs

At the end of Phase Two, the following tasks should be complete:

_____ identify the people or person responsible for developing the training plan and
_____ facilitate the hand-off of the project to them.

4.4 PHASE 3: PERFORM GAP ANALYSIS

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┌─────────────────────────┐
│      Get Informed       │
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            ↓
┌─────────────────────────┐
│    Organize Workload    │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│   Perform Gap Analysis  │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│  Identify job roles and │
│      responsibilities   │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│ Identify required QA skills │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│ Identify existing skill level │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│      Describe gaps      │
└─────────────────────────┘
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┌─────────────────────────┐
│     Validate results    │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│  Identify Methods of    │
│   Addressing Goals      │
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┌─────────────────────────┐
│   Formulate the Plan    │
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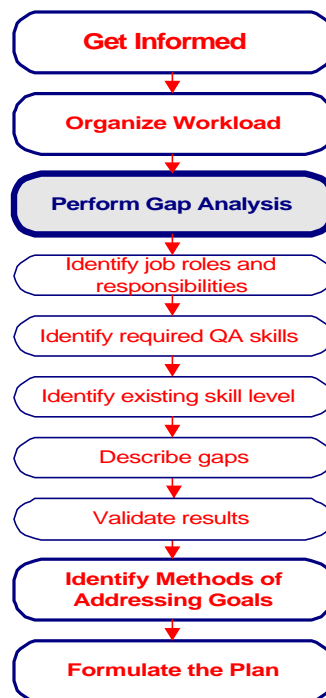
The purpose of performing a *Gap Analysis* is to identify the difference between what skills a unit requires to perform optimally and what skills currently exist in its employees. To identify the gap, the following tasks should be completed:

1. identify job roles and responsibilities,
2. identify required QA skills,
3. identify existing skill levels,
4. describe gaps, and
5. validate results.

Random interviews of staff managers will provide information for the first three tasks within this phase -- identifying tasks of the unit, QA related skills required to perform them, and existing skill levels within a unit. The focus of the first two tasks is on the jobs in the unit, rather than the individual employees. Training needs to be targeted toward specific jobs because its shelf life will be longer than the average employee's tenure in any one job.

Interviews for task one can be structured into two parts:

1. Identify the required skills of the unit:
    *   What tasks *should* be performed in the unit?
    *   What skills are *required* to perform the tasks?
    *   Which of those required skills are QA related?

2. Identify existing QA related skill levels:
    *   What tasks *are performed* in the unit?
    *   What skills *are used* to perform the tasks?
    *   Which of those skills are QA related?

The third task is to compare the list of required skills against the list of existing skills to see where the gaps exist. Refer to the Gap Analysis Matrix in Section 3.4, Phase 3 for a more structured approach to the review. Describe those gaps in as much detail as possible, making note of questions that arise during the review. The focus of this task can be based on current employees, but should be broad enough to include potential employees.

Confirm the information and obtain answers to questions by meeting with managers, stakeholders and/or employees. Wherever possible, implement feedback from these individuals.
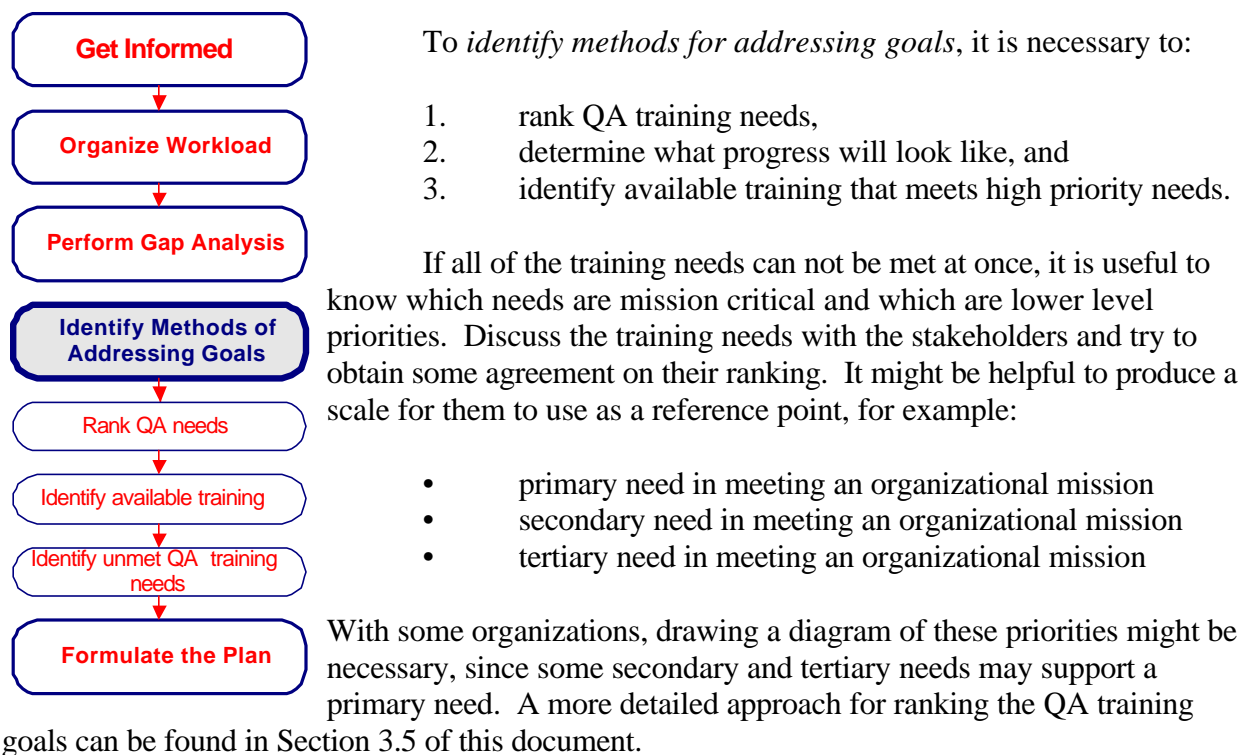
Box 11. Alternative Phase 3 Outputs

At the end of Phase 3, the following tasks should be complete:

_____ identify, describe, and validate the gap between the required and existing skills.

4.5   PHASE 4: IDENTIFY METHODS FOR ADDRESSING GOALS

Get Informed

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Organize Workload

↓

Perform Gap Analysis

↓

Identify Methods of Addressing Goals

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Rank QA needs

↓

Identify available training

↓

Identify unmet QA training needs

↓

Formulate the Plan

To *identify methods for addressing goals*, it is necessary to:

1.   rank QA training needs,
2.   determine what progress will look like, and
3.   identify available training that meets high priority needs.

If all of the training needs can not be met at once, it is useful to know which needs are mission critical and which are lower level priorities. Discuss the training needs with the stakeholders and try to obtain some agreement on their ranking. It might be helpful to produce a scale for them to use as a reference point, for example:

- primary need in meeting an organizational mission
- secondary need in meeting an organizational mission
- tertiary need in meeting an organizational mission

With some organizations, drawing a diagram of these priorities might be necessary, since some secondary and tertiary needs may support a primary need. A more detailed approach for ranking the QA training goals can be found in Section 3.5 of this document.

After ranking the QA training needs, develop a list of milestones so that progress can be identified and reported. Acknowledging progress helps maintain momentum on the project and provides checkpoints for success.

There may be existing training that will meet some training needs. Discuss this possibility with training coordinators or managers in addition to looking through appropriate training catalogues. Chapter 5 of this document contains more information about QA training resources. Some training goals of the unit may link with organization-wide training goals, in which case they can be addressed in a similar fashion.

List the QA training needs and any existing training that can meet them, understanding that some training may meet several needs and that others may meet partial needs. Refer to the Course Evaluation Matrix (Table 3) for assistance. All of this information should be noted in detail so it can be included in the training plan.

The documentation should include the training goal, its priority, how it will be addressed, the resources required to address it, and the availability of the necessary resources.

Box 12. Alternative Phase 4 Outputs

At the end of Phase 4, the following tasks should be complete:

_____identify and document which of the currently available training meets QA training needs and to what extent.

4.6   PHASE 5: FORMULATE THE TRAINING PLAN

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┌─────────────────────┐
│   Get Informed      │
└─────────────────────┘
          ↓
┌─────────────────────┐
│  Organize Workload  │
└─────────────────────┘
          ↓
┌─────────────────────┐
│ Perform Gap Analysis│
└─────────────────────┘
          ↓
┌─────────────────────┐
│ Identify Methods of │
│  Addressing Goals   │
└─────────────────────┘
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┌─────────────────────┐
│  Formulate the Plan │
└─────────────────────┘
          ↓
┌─────────────────────┐
│ Write the training plan │
└─────────────────────┘
          ↓
┌─────────────────────┐
│   Evaluate the plan │
└─────────────────────┘
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┌─────────────────────┐
│ Obtain stakeholder feedback │
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┌─────────────────────┐
│  Implement the plan │
└─────────────────────┘
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The final piece of developing a QA training plan is to take the information gathered in the first four phases of development and *Formulate the Training Plan.* There are four steps to this phase:

1.   write a draft QA training plan,
2.   evaluating the plan,
3.   obtain feedback from stakeholders, and
4.   implement the plan.

The draft QA training plan should include the following sections:

- **Reasons for developing a training plan**: This section should include a detailed account of the conclusions drawn from Phase 1: Get Informed.
- **Gaps between required and existing skills**: This section should include the results of Phase 3: Perform Gap Analysis.
- **Plan of action**: This section should include the results of Phase 4: Identify Methods to Address Goals. In addition it should include a time line for addressing each goal and assign roles and responsibilities for completing each piece of the plan.

After the draft plan is written, it should be compared with the initial performance issues uncovered during Phase 1:

- to make sure that, in theory, the plan will address these issues,
- to see if the training goals identified in Phase 3 can meet them, and
- to uncover unit needs that overlap with organizational needs. In this case, the unit need may already be met by the organization's plan.

These links are important and it should be made as clearly as possible in the report. The draft should then be shared with the stakeholder group, obtain their feedback, and include it in the final report. Upon completion and approval of the final report, it should be implemented as quickly as possible to maintain the momentum built by the development process.

Box 13. Alternative Phase 5 Outputs

At the end of Phase 5, the following tasks should be complete:

_____Create, evaluate and validate the QA Training Plan.

4.7   RATIONALE FOR THE SIMPLIFIED MODEL

This chart provides insight into the thinking process behind the suggested shortened process. It outlines the purpose of each sub-process in the Chapter 3, the effect of eliminating each sub-process, and ways in which each important step could be accomplished in a quick and easy way. The processes listed here match the processes in Chapter 4. The sub-processes listed here encompass all of the sub-processes; however, a few sub-processes have been combined and rearranged to streamline the process.

Process	Sub-process	Purpose	Effect of Elimination	"How could this be done quickly and easily"
Up-front Assessment	Describe the reasons for building a training plan	To provide insight into the expectations the plan should meet; to identify the problem the training plan will address	Unclear expectations, confusion, lack of coordination of efforts, scope creep	Initial conversation with stakeholders, ask for additional sources of information
	Determine the best solution	To research the problem and determine if training or some other method is the most appropriate solution	Lack of information, unclear expectations, lack of mission, lack of perspective, waste of time	Read additional sources of information; determine if training or non-training solution is best
	Create a team and assign roles	To identify who will be responsible for what; to gather a dedicated staff to work on issues; to create a group of stakeholders and supporters	Lack of support from organization, no dedicated staff, unclear expectations and no accountability, ambiguous leadership roles and unwieldy responsibilities	Second conversation with stakeholders and potential team members (including person whose permission is needed to assign roles)

Process	Sub-process	Purpose	Effect of Elimination	"How could this be done quickly and easily"
Needs Assessment	Decide what jobs to assess	To identify the unit of jobs needing assessment (Unit Assessment)	Lack of clear starting point, no consensus on where to begin	Can occur during the second conversation with the stakeholders and potential team members
	Identify the KSAs required to perform the jobs	To identify responsibilities and activities required for each role; to break down the jobs into specific tasks and evaluate the knowledge and skills needed to perform them. (Main tasks, decisions and options, sequence in order of performance, create flowchart, identify QA KSAs) (Hierarchical Job Assessment)	No identification of desired state. If you don't break down the tasks, it's hard to see what skills they require- some are obscure. This step helps create a systematic approach; otherwise the large amount of information may become unwieldy, causing confusion and overlooking important skills	Interview managers or select staff: What does each role do? What is the process each one follows (step by step)? What do they need to know/be able to do in order to fulfill role?
	Identify those KSAs that are QA-related	To identify those tasks that require QA KSAs (Hierarchical Job Assessment)	Lack of knowledge of required QA skills; won't have a clear idea of what needs to be accomplished	During the interview with managers or select staff, the question "What QA skills do they need to have in order to fulfill role?" can be asked.

Process	Sub-process	Purpose	Effect of Elimination	"How could this be done quickly and easily"
	Determine the existing knowledge and experience	To examine the KSAs currently held by groups of employees who are/will be performing QA related functions (identify unit of assessment, conduct research, confirm findings, document)	Won't have good idea of what needs to be accomplished; need to know what is in place in order to figure out what needs to be done	Interview employees: How does the employee perform the task? How frequently? How would the employee rate their ability? What are reasons for rating? How does the employee perform the task? (Process)
Analyzing the Needs Assessment Data	Compare existing skills with required skills	To determine the gap between desired and existing skills	Won't have good idea of what needs to be accomplished; need to know what is in place in order to figure out what needs to be done	Team meeting (if feasible) compare two sets of data
	Validate the results	To get feedback from stakeholders and resolve discrepancies	May be missing important feedback, input, news, developments, support, perspective, buy-in	Submit summary report to stakeholders and ask for feedback
Developing a Training Plan	Rank the training goals	To prioritize needs and goals to make sure the plan will address most important issues; to gather input from representatives of each level and assess how important each goal is to the unit	Won't have priorities in place; won't know what goals should be accomplished first; may start on a path that isn't optimal or sanctioned; won't have the big picture.	Team meeting: Rank goals

Process	Sub-process	Purpose	Effect of Elimination	"How could this be done quickly and easily"
	Define success	To provide a unified understanding of goals; to specify how people will know that the QA training needs have been achieved (how it would look if the goal were achieved, how work would flow, speed of work completion, results)	Won't know when real progress has been made.	Team meeting: Define success and milestones
	Compare the current QA training resources to training goals	To determine what QA-related training is currently being offered and how it could be used to meet training objectives	May cause redundant work, wasting time, money, and effort	Task force to gather information on existing training
	Validate and document results	To get feedback from people familiar with the courses and training needs	Won't have the full information on a subject or the right perspective; might think that a course achieves a goal that it doesn't or might not know that a course does achieve a stated goal	Send results to EPA training coordinators or other well-informed staff

Process	Sub-process	Purpose	Effect of Elimination	"How could this be done quickly and easily"
Constructing the Training Plan	Create a time line for achieving each training goal	To determine when goals will be met (based on priority and available resources); to provide a framework for determining success and progress	Won't have a clear schedule; might cause confusion, slow down the pace, and cause missed deadlines	Team meeting: Time line
	Identify how each training goal will be met	To balance the pros and cons of each approach to addressing training needs; to detail priorities, deadlines, approaches, resources needed, and availability of resources for each goal	Might choose the wrong approach and not know it until it is too late; might cause waste and rework	Team meeting: Methods (before Time line)
	Consolidate plans; Identify redundancy	To determine when needs or efforts to address them are being duplicated, to save time, resources, fill needs	Redundancy, waste of time, money and effort	Meet with stakeholders; training coordinators
	Identify roles and responsibilities	To determine who should be doing what; to familiarize new members with the background of the plan	Confusion and irritation for involved staff; unrealistic expectations; low group cohesion, lack of accountability	Conversation with stakeholders and potential team members (including person whose permission is needed to assign roles)

Process	Sub-process	Purpose	Effect of Elimination	"How could this be done quickly and easily"
Evaluating the Training Plan	Compare the plan to the original request	To review original reasons for this training plan; to make sure the project is on track; if not, to correct; to get input from originator of request	Won't know if on the right track; waste of time, money, and effort if later it is determined that the training plan doesn't address concerns	N/A
	Compare the plan to training goals	To determine if plan is likely to meet original goals; to determine the need for revisions to meet goals	Waste of time, money, effort if later it is determined that the training plan does address goals	N/A
	Obtain stakeholder feedback (should happen throughout- not at end)	To get feedback from stakeholders; to implement suggestions from stakeholders	Lack of support, perspective, help, news, developments, direction, buy-in; leading to an incomplete effort	N/A

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CHAPTER 5

QA TRAINING RESOURCES

A single generic training program cannot address all possible QA training needs. While some core training courses may address basic training needs, organizations and programs are complex and diverse; organization-specific training needs should be addressed and satisfied.

Changing roles, new organizational needs, and changes in priorities all contribute to the tremendous challenge in attaining suitable training resources. The training resource selected by an organization will be based on identified training needs, selected training strategies, and budget allowances. Some training resources are discussed below. Other possible resources include Human Resources Departments and other Federal and State agencies. This list is not all inclusive, but provides a starting point in evaluating resources for the QA training program.

5.1   AGENCY-WIDE QA TRAINING RESOURCES

The Quality Staff acts as a resource for the EPA Quality System by providing training materials, guidance documents, training instructors, and assistance to EPA organizations in presenting training. For example, the Quality Staff addresses training issues on Agency requirements for Quality Management Plans or QA Project Plans, as well as guidance on implementing specific processes such as the Data Quality Objectives (DQO) and Data Quality Assessment processes.

Three types of training resources have been developed by the Quality Staff:

- Generic training materials for Agency-wide tailoring and use;
- Advanced training courses delivered by the Quality Staff; and
- Computer based training.

Generic courses developed by the Quality Staff are intended to provide a working understanding of the EPA Quality System and its components. These training courses enhance an employee's ability to address tasks associated with planning, implementation, and assessment of the Quality System. The generic courses may be tailored to fit the specific requirements of EPA organizations. While no Agency-wide mandatory QA training requirement exists, some existing Agency training courses may be used to train staff and management to adequately perform QA tasks defined in EPA Order 5360.1 CHG 1 (see Table 7). For a complete listing of Quality Staff training, contact the Quality Staff (see Foreword).

Table 6. Example QA Training

QA and QC Functions	Suggested QA Training	Quality System Level of Function
Establish, document, and periodically revise Agency policies and procedures for planning, implementing, and assessing the effectiveness of the mandatory, Agency-wide Quality System	• Introduction to EPA Quality System Requirements	Policy
Ensure that all organizational components and applicable programs comply fully with the requirements of EPA Order 5360.1 CHG 1	• Introduction to EPA Quality System Requirements	Program
Perform periodic assessments of organizations conducting environmental programs to determine the effectiveness of their mandatory quality systems	• Management Systems Review Workshop	Program
Ensure that environmental data are of sufficient quantity and adequate quality for their intended use and are used consistent with such intentions	• Introduction to DQOs • Integrating QA into Project Development (Advanced) • Sampling Designs for QA Project Plans (Advanced)	Project
Ensure that all Agency funded environmental programs implemented through extramural agreements comply fully with applicable QA and QC requirements	• Introduction to EPA Quality System Requirements • Introduction to DQOs • Integrating QA into Project Development (Advanced) • Data Quality Assessment	Project

Computer-based training (CBT) provides an easily accessible, self-paced method for training as computer-based programs can be easily distributed and accessed anytime. The Quality Staff's CBT curriculum provides QA technical management training support in data collection and basic information on data collection and data analysis activities. CBT training is useful for newly employed EPA staff assigned QA responsibilities. The Quality Staff's CBT curriculum currently consists of 3 separate computer routines: *The Data Quality Objectives Library*, *QA in the Laboratory*, and *The Hazardous Waste Field Sampling Library*. All are available on the Quality Staff's Web site.

5.2 USE OF CONTRACTORS/CONSULTANTS

Many situations may warrant procurement of training expertise from outside sources. QA responsibilities may require highly technical and specialized expertise. Additionally, the most cost effective approach may be to use the services of contractors or consultants. Using consultants may be the most cost-effective way to meet training needs when you need unique skills, specialized experience, or knowledge that is not readily available within your organization.

Organizations such as the American Society of Quality and the American Chemical Society offer a comprehensive list of QA-related training courses which cover a wide range of topics. Private firms also offer courses in quality management and related quality topics.

5.2.1 Inherently Government Functions

Contractors and consultants often can be used to create or support the production of training materials. However, many quality system activities involving environmental data operations are inherently governmental functions and must be performed only by EPA personnel or by personnel explicitly authorized by EPA based on statute, regulation, or by the terms of an extramural agreement. Such representatives may include other governmental personnel and with specific authorization, contractor personnel. When such quality management tasks are performed by a contractor, the contract must be appropriately managed and must remain under the control of the authorized EPA contracting representatives. EPA cannot use cooperative agreements or grants to provide quality management activities such as QA and QC services for EPA because it is an inappropriate use of financial assistance (Office of General Counsel memorandum, August 2, 1994).

Technical direction or other instructions to an extramural organization, relating to performance of an extramural agreement, shall be provided only by authorized EPA or other Government representatives in accordance with the terms of the applicable extramural agreement. Only authorized EPA or other Government representatives are to provide direction or instructions to an extramural organization providing quality systems support for environmental programs. This is to avoid such actions as:

- The providing of directions or instructions that are inconsistent with the terms of an extramural agreement,
- Unauthorized access to confidential business information, or
- Unauthorized access to information that may allow an extramural organization to gain an unfair competitive advantage.

5.2.2 Prepare and Present QA Training Materials and Courses

Exclusively EPA Functions are defined as inherently governmental work which must be performed only by responsible EPA officials, including the QA Managers, or authorized EPA representatives.

- Developing and presenting detailed guidance and training for QA and QC activities based on interpretation of Agency-wide requirements and guidance.

Discretionary Functions are defined as activities that may be performed either by EPA personnel or by non-EPA personnel under the specific technical direction of and performance monitoring by the QA Manager or other responsible EPA or Government official under an approved contract, work assignment, delivery order, task order, etc.

- Providing or coordinating quality-related training for the organization in special skill areas identified by the Agency and not generally available to the organization.

- *Providing allowable technical and/or logistical assistance in preparing and presenting quality-related technical training (within the Agency's implementation of special management and control measures and the constraints of potential for conflict of interest, of revealing confidential business information, or of appearing to be interpreting or representing Agency policy).*

5.2.3   Additional Considerations

The process of articulating requirements, setting project parameters, and defining outputs so that specific training needs are met can be complex. Accordingly, it is important to:

- Ensure that your organization's needs are explicitly defined
- Define the task completely before beginning the procurement process
- Agree on checkpoints, outputs, and expected results
- Carefully monitor progress and provide direction as needed

If the primary role of the contractor is to design and deliver instructional materials, it is helpful to ensure that the selected firm has a working knowledge of the Instructional Systems Design process, alternative training methods, and the application of technology in training practices. It can also be helpful for the firm to have some knowledge and understanding of the topic being taught. When considering contractor/consultant services for training assessment or development services, it is important to determine that the firm has:

1. An understanding of the EPA Quality System
2. A demonstrated capacity to assess organizational training needs
3. A strategy to involve the organization in assessment, planning, and critical stages of decision making
4. An approach that will adapt established methodologies for training strategies to the specific organization with which they work
5. The ability to change from a content-based technique to a process orientation as organizational needs and issues arise

Finally, contractor/consultant services should enhance the overall training effort without imposing a consultant-created plan. The organization's contributions to the training program are critical to its success.

5.3   IN-HOUSE COURSE DEVELOPMENT

There will likely be instances when current QA offerings and contractor services are not readily available and in-house development is the only option. This section provides information about the general steps involved with course development. More information can be found in the reference section of this document. The general steps involved in creating a course include:

1.   Develop training objectives
2.   Select training methods
3.   Select practice activities
4.   Develop a course outline
5.   Develop a training schedule
6.   Develop a training syllabus

Develop Course Objectives

The *Course objective* describes what an individual will know or be able to do after completing the course. A course objective should include three components:

- What KSAs are to be demonstrated
- Who is to demonstrate the KSA
- When the KSAs are to be demonstrated

In addition, a course objective can include two more components:

- What the individual may be given to demonstrate the KSA
- What level of achievement is required for the KSA

Each course should have at least one objective. Each course objective should be supported by a series of *enabling objectives* that outline the KSAs one must acquire in order to achieve the course objective. The Objectives Form (Box 14) provides a guide for creating course objectives and their enabling objectives. Enabling objectives provide order to training presentations because they lead the training to the course objective. Enabling objectives consist of two components:

- The action to be taken
- The object of the action

Box 14. Objectives Form

Course Objective: After completing this course, _____the student_____ will be able to _apply QA concepts to environmental study plans and reports_ _____.
Enabling Objectives: To attain the course objective, _____the student_____ will:

1. _Identify QA concepts_
2. _Identify the purpose of environmental study plans and reports_
3. _Understand the impact of QA concepts on plans and reports_

Select Training Methods

The selection of the *training methods* relies heavily on the objectives that are to be taught in the course. There are several considerations to be made in making this selection:

- Is the method appropriate for the objectives?
- Are the resources available?
- What facilities are required?
- What is the projected size of the group to be trained?
- What is the background of those attending?
- What are the most common training methods (illustrated lecture, demonstration, discussion, case studies, guided practice, self-paced learning, distance learning, coaching, on-the-job)?

Select Practice Activities

Individuals receiving information or developing skills should be able to practice their new knowledge and receive feedback on their applications. These *practice activities* should be dynamic and engaging, and they should require the individual to interact with the content and/or other people in the course.

Feedback should occur as soon as possible after the activity and be clearly stated so that the student can integrate it with their new knowledge. Examples of practice activities include:

- Solve a series of problems
- Answer a series of questions
- Locate information in a manual
- Perform a series of calculations
- React to a case study
- Practice a skill following a technical manual
- Participate in a role play
- Conduct an interview

Develop Course Outline

The *course outline* is a plan of the training that will be delivered. It is divided into five columns as illustrated in Table 7.

Table 7. Course Outline Template

Top	Sub-topic	Teaching Points	Instructional Strategy	Duration
Primary concepts covered during the course	Concepts that support each topic. There will most likely be more than one sub-topic for each topic	A list of items to be discussed during the discussion of each sub-topic	Method for conveying the concepts (i.e., lecture, exercise, video, experiential activity)	How long it will take to complete each Instructional Strategy. The time can be totaled at the end of each topic

Develop a Training Schedule

From the course outline, a *training schedule* should be created to distribute to participants on the first day of training. The schedule will help the developer ensure that all training objectives and activities are completed in the allotted time.

Develop a Training Syllabus

A *training syllabus* provides information about a course and is often given to participants in advance of the course. It can include the following information:

- Course title and description
- Course objectives
- Course topics
- Description of the target audience
- Length of the course
- Course prerequisites
- Location of the course
- Information about the instructor
- Description of materials the participant will need or receive
- Description of any items the participant should bring to the course

In conclusion, developing a course can be resource intensive and should not be attempted without careful consideration of the costs and benefits. Prior familiarity with the topic, the use of

existing documentation, and effective collaboration among the principals involved in design and delivery of training materials will expedite the process.

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APPENDIX A
FORMS FOR DEVELOPING A TRAINING PLAN

Unit Assessment Form

Date:	Name:	
Unit Description:		
Job List (include all functions in the unit listed above)		**Staff Size:**
Job Title	**Responsibilities**	**Primary Tasks**

Hierarchical Job Assessment Form

A. **Job Title**	
B. **Primary Job Tasks**	

1.	
2.	

C. **List the Sub-tasks related to each task**	

Task 1	Task 2
Sub-task 1	Sub-task 1
Sub-task 2	Sub-task 2
Sub-task 3	

D. **List KSAs needed to perform each sub-task**	

Task 1	Task 2
Sub-task 1	Sub-task 1
Sub-task 2	Sub-task 2
Sub-task 3	

E. **List QA Related KSAs**	

Task 1
-
-
-

Task 2
-
-

Gap Analysis Matrix

Required KSAs	Unit Description or		
	Job Category 1	Job Category 2	Job Category 3

Ranking Matrix Form

Options - Unmet Training Needs	CRITERIA				
	Weight %	Weight %	Weight %	Weight %	Total Weight %100

Course Evaluation Matrix Form

Courses	Training Goals			

QA Training Plan Form

Training Goal	Priority	Due Date	Training Method(s)	Resources Needed	Resource Availability

Course Objectives Form

Course Objective 1: After completing this course, _____ will be able to
_____

Enabling Objectives: To attain the course objective, _____ will:

1._____
2._____
3._____
4._____

Course Objective 2: After completing this course, _____ will be able to
_____

Enabling Objectives: To attain the course objective, _____ will:

1._____
2._____
3._____
4._____

Course Objective 3: After completing this course, _____ will be able to
_____

Enabling Objectives: To attain the course objective, _____ will:

1._____
2._____
3._____
4._____

Course Objective 4: After completing this course, _____ will be able to
_____

Enabling Objectives: To attain the course objective, _____ will:

1._____
2._____
3._____
4._____

Course Outline Template Form

Topic	Sub-topic	Teaching Points	Instructional Strategy	Duration

APPENDIX B
INSTRUCTOR GUIDE TEMPLATE

OVERVIEW

At the end of this unit, participants will be able to:

List Unit or Lesson Objective here.

NOTE TO INSTRUCTORS:

List any notes to the instructor here.

CONTENTS AND APPROXIMATE TIME

Section	Minutes
Total Time	

MATERIALS

List any classroom materials here.

OVERVIEW OF UNIT (5 minutes)

Display the slide.

Slide #

List text for the instructor here in the following format:

Say: xxxxxx

Explain: xxxxxx

THE ASSESSMENT REPORT (10 minutes)

Display the slide.

Slide #

Insert a symbol
denoting Instructor
Text here

List text for the instructor here in the following format:

Say: xxxxx

Tell: xxxx

Remind: xxxxxx

SUMMARY AND TRANSITION (5 minutes)

Insert a symbol
denoting Instructor
Text here.

Summarize the unit by reviewing the following points:

Provide the instructor with guidance about wrapping up the day or the training and transitioning to the next day (when appropriate).

Insert a symbol
denoting Instructor
Text here.

Explain that this is the end of the day of training or of the course.

Transition to the next day by saying all of the next day will be spent reviewing.

```
                              Break
```